

Addendum to Quality Assurance Project Plan

Methow Subbasin Water Quality Restoration and Monitoring Program

Agreement: G1400529

Addendum Agreement No:
WQC-2015-MSRF-00104
WQC-2016-MSRF-00269

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Addendum to Quality Assurance Project Plan

Methow Subbasin Water Quality Restoration and Monitoring Program

Water Quality Monitoring Expansion Addendum 1

April 2016

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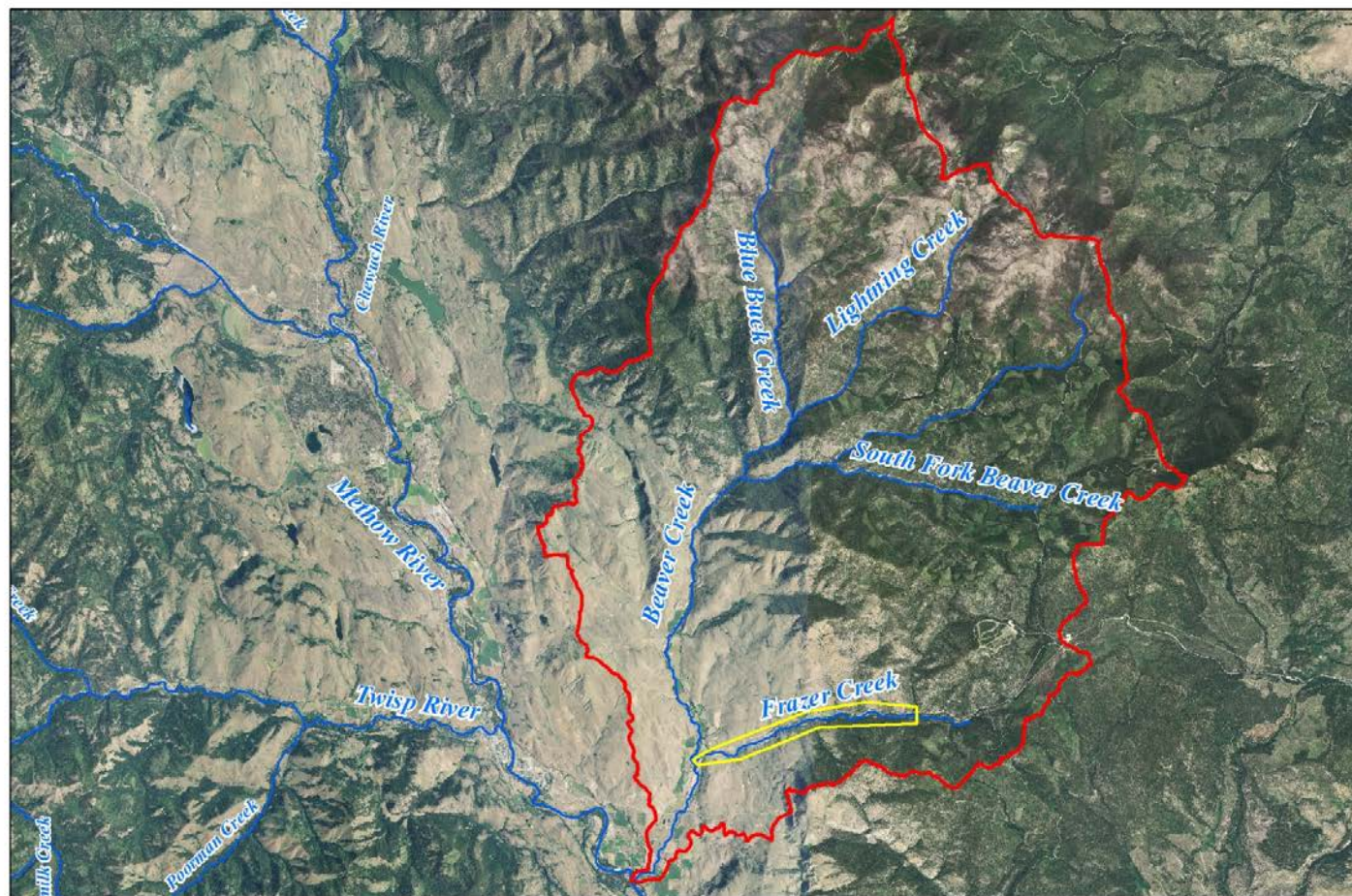
2.0 Abstract

This addendum expands the sampling period of monitoring efforts described in the original QAPP (Agreement G1400529) through November 1st 2018. Six additional temperature monitoring sites will be added to the existing monitoring network. Additional water quality and sediment monitoring will be established on Frazer Creek to monitor trends in water quality following a large scale disruption of the system due to fire and flooding in 2014.

3.0 Background

The *Methow Subbasin Water Quality Monitoring Program* has supported and expanded upon water quality monitoring efforts that have been ongoing in the Methow subbasin since 2010 (Ecology agreements G1000282, G1100202, and G1400529). Water quality monitoring includes year-round water and air temperature, seasonal water quality, and annual sediment monitoring. This project assists in the definition of short-and long-term water quality trends, assesses the effectiveness of restoration activities, offers a baseline of water quality conditions as they relate to Washington State 303(d) listings in the Methow subbasin and provides data to support total maximum daily load (TMDL) development as necessitated by a 303(d) listing.

Frazer Creek is located within the Beaver Creek watershed within the Methow watershed - WRIA 48 (Figure 1). In 2014, a large wildfire burned much of the vegetation the Beaver Creek drainage surrounding Frazer Creek; including a significant amount of the riparian buffer. Subsequent flooding has significantly altered the longitudinal and horizontal profile of the stream. Planning for a targeted restoration effort to re-establish riparian habitat and stream complexity was initiated in 2015.



Methow Water Quality Monitoring Program

- ▬ Beaver Creek Watershed Boundary
- ▬ Frazer Creek Project Area (approximate)
- ▬ Major Perennial Streams



0 0.75 1.5 3 4.5 6 Miles

Figure 1. Location of Frazer Creek project area within the Beaver Creek assessment unit.

4.0 Project Description

4.1 Project goals

The goal of the *Methow Water Quality Restoration and Monitoring Project* is to monitor and document the status and trends in water quality throughout the Methow watershed. The project will use this information to assist in an assessment of the effectiveness of a suite of restoration actions focused on improving water quality conditions and instream habitat. Data will also be used to monitor changes in water quality relative to Washington State 303(d) listings while providing data to develop the TMDL as necessitated by multiple 303(d) listings in the Methow watershed. This addendum extends and expands monitoring through November 1st, 2018. It also expands the previously established monitoring network to include additional temperature, water quality, and sediment monitoring of Frazer Creek to identify water quality trends and changes in sediment load following the 2014 fire and flood events.

The monitoring effort is centered on examining the effectiveness of priority riparian restoration projects that have been implemented to improve water quality. The network of projects has been expanded beyond the initial projects identified in the original QAPP (Agreement G1400529) and are funded under two new agreements between MSRF and Ecology (Agreements WQC-2015-MSRF-00104 and WQC-2016-MSRF-00269).

4.2 Project objectives

The original QAPP has been expanded to include the following project objectives:

1. Continue monitoring at sampling sites established in the original QAPP (Agreement G1400529) through November 1st 2018.
2. Expand the existing water quality effectiveness monitoring program to include Frazer Creek. A water quality monitoring site will be established in the lower reach of Frazer Creek to monitor changes in water quality within this system. Seasonal (April through November) water quality parameters including temperature, dissolved oxygen, pH, conductivity, turbidity, and chlorophyll *a* will be measured.
3. The year-round water temperature status and trending monitoring network will be expanded to include six additional locations (Table 1 and Table 2) in association with recent stream restoration projects.
4. Expand the annual sediment monitoring (McNeil core sampling) to include a site in lower reach of Frazer Creek.

Table 1. Project locations and descriptions for selected 319 restoration projects under agreements WQC-2015-MSRF-00104 and WQC-2016-MSRF-002692.

Stream	River Mile (RM)	Project Type	Primary Limiting Factors Addressed
Methow River	47.5	Riparian enhancement through riparian buffer establishment.	Habitat diversity and quantity, riparian condition
Methow River	45.5	Riparian enhancement through riparian buffer establishment.	Habitat diversity and quantity, riparian condition
Twisp River	4-5	Riparian enhancement through riparian buffer establishment and floodplain connectivity	Habitat diversity and quantity, habitat connectivity, riparian condition
Frazer Creek	0-3	Riparian enhancement through riparian buffer establishment	Habitat diversity and quantity, habitat connectivity, riparian condition

Table 2. Proposed new temperature monitoring station locations for agreements WQC-2015-MSRF-00104 and WQC-2016-MSRF-002692.

Subbasin	Stream	Monitoring Site	Latitude (estimated)	Longitude (estimated)
Beaver	Frazer Creek	Frazer at Hwy 20	48.361000	-120.036000
Beaver	Frazer Creek	Upper Frazer	TBD	TBD
Lower Twisp	Twisp River	Twisp at Poorman Cutoff Rd	48.373667	-120.202500
Lower Twisp	Twisp River	Twisp River Floodplain	48.370333	-120.199333
Lower Twisp	Twisp River	Twisp Mouth	TBD	TBD
Upper Methow	Goat Creek	Goat Creek at Vanderpool	48.661016	-120.330119

5.0 Organization and Schedule

5.4 Project schedule

The project schedule outlined in the original QAPP (Agreement G1400529) has been expanded to include monitoring efforts through November 1st, 2018 (Table 3).

The additional activities associated with this project will follow the same field activities schedule outlined in the original QAPP (Agreement G1400529). New temperature and water quality monitoring locations will be established in April 2016. Sediment sampling in Frazer Creek will be in later summer/early fall 2016.

Table 3. Revised project schedule for the *Methow Water Quality Restoration and Monitoring Project*.

Project Planning	Dates
Addendum to Quality Assurance Project Plan	November 2015
Data entry and analysis	On-going and as needed beginning May 2016
Annual report of monitoring program including data input into Ecology's EIM database.	March 31 th - 2017, 2018, and 2019
Field Activities	Dates
Temperature monitoring	Year-round, field visits at least 3 times a year (April, July, October)
Water quality (multiprobe) monitoring	April-November or when conditions permit, field visits every 3 weeks or as needed
Sediment Monitoring	Annually during late summer/early fall

7.0 Sampling Process Design

7.1 Study design

7.1.2 Sampling location and frequency

All sampling methods and frequencies of measurements will be identical to the original QAPP (Agreement G1400529).

The temperature monitoring network will be expanded to include effectiveness monitoring of additional restoration projects (Table 2 and Figure 2).

Additional temperature monitors will be placed in Frazer Creek to establish a trend of water temperature in this system following a significant fire and flooding event (Table 1 and Table 2).

In addition to water quality monitoring of restoration actions on the Methow, Twisp, and Chewuch rivers, a water quality monitoring station will be established in a lower reach of Frazer Creek (*Figure 2*). This monitoring station will be used to monitor trends in water quality following a large scale disruption of the system due to fire and flooding in 2014 as well as in response to restoration actions. Seasonal water quality parameters will be measured on an hourly basis from, generally from April through November. Water quality parameters collected by these instruments include temperature, dissolved oxygen, pH, conductivity, turbidity, and chlorophyll *a*. To prevent damage to and loss of water quality monitoring equipment the instruments will not be deployed during spring freshets.

The sampling framework for the sediment monitoring program will be expanded to include Frazer Creek. Annual sampling will occur on a lower reach of Frazer Creek to monitor changes in sediment load as they may relate the fire of 2014 and subsequent flooding.

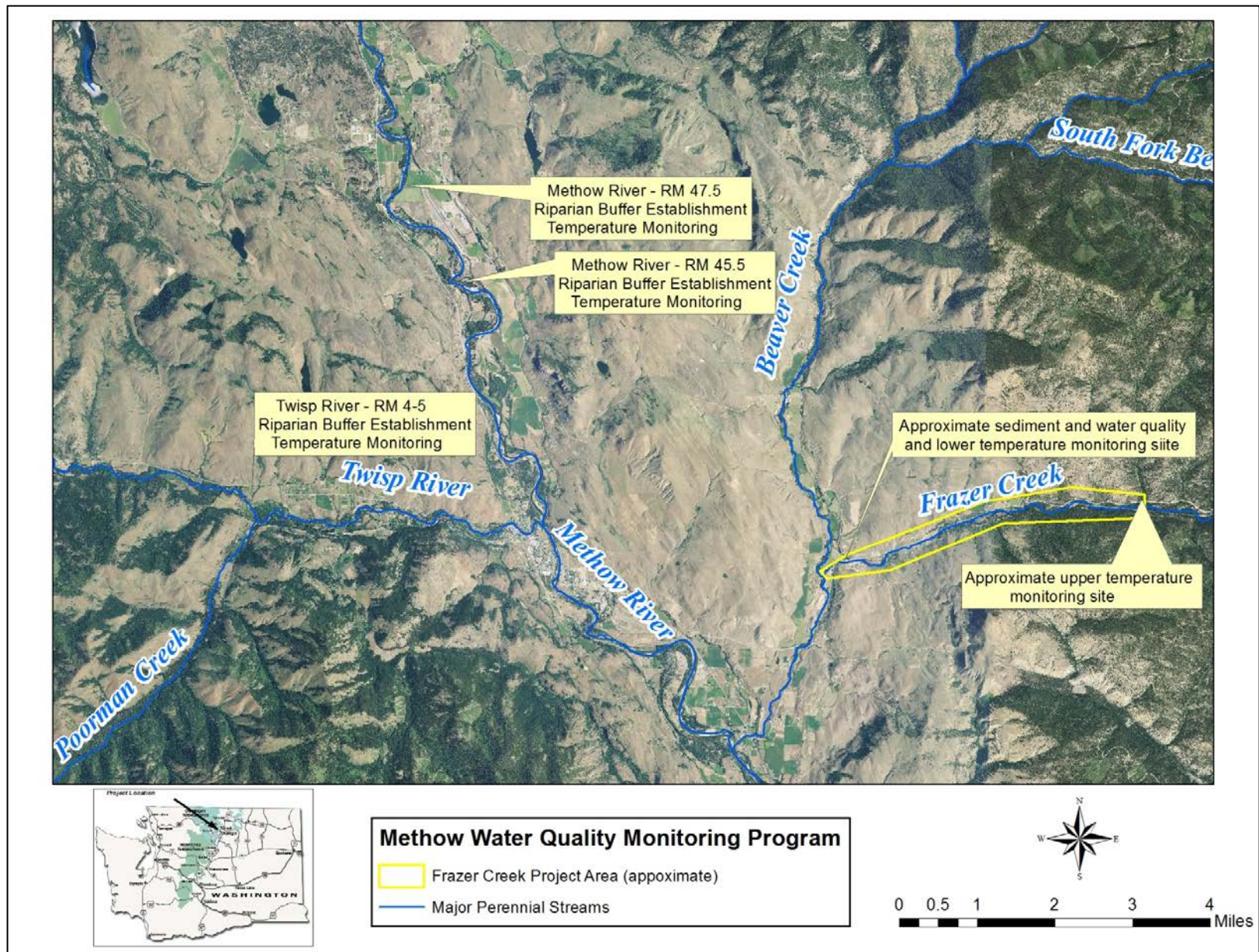


Figure 2. Location of restoration projects and additional effectiveness monitoring sites.

14.0 Data Quality Assessment Procedure

14.1 Process for determining whether project objectives have been met

All data will be reviewed to assure that it meets quality objective standards. All data that do not will be flagged. Reviews will be conducted to evaluate any data that is not meeting quality objective standards and corrective actions will be taken. Instruments will be calibrated and checked for accuracy based on designated protocol (ODEQ 1999, Ward 2001, Tussing 2009, *modified from* Schuett-Hames 1999). Data associated that does not meet calibration requirements or fall within a reasonable range will be rejected. The protocols and standards outlined in Ecology's *Recommended procedures for continuous multi-parameter water quality meter deployments* document¹ will be adhered to whenever possible. Calibration standards will be tested for accuracy with a duplicate standard every other deployment period. Calibration standards that do not meet calibration check will be discarded.

Data will be kept in a database and will be available for review. A full post-deployment data review will be conducted for each measured parameter after each deployment in alignment with steps 22-26 in Ecology's *Recommended procedures for continuous multi-parameter water quality meter deployments* document¹.

14.2 Data analysis and presentation methods

Data will be presented in annual and final reports and uploaded to Ecology's EIM database. The summary report will include a quality assurance section that will summarize quality control results and the procedures used to ensure data quality during the monitoring project. Data results, problems, and corrections will be included in annual reports.

The data collected for this addendum will be summarized in an annual report in March 2017, 2018, and 2019.

¹ Dan Dugger, Washington Department of Ecology, unpublished document.